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CLIMATE ANALYSIS CENTER

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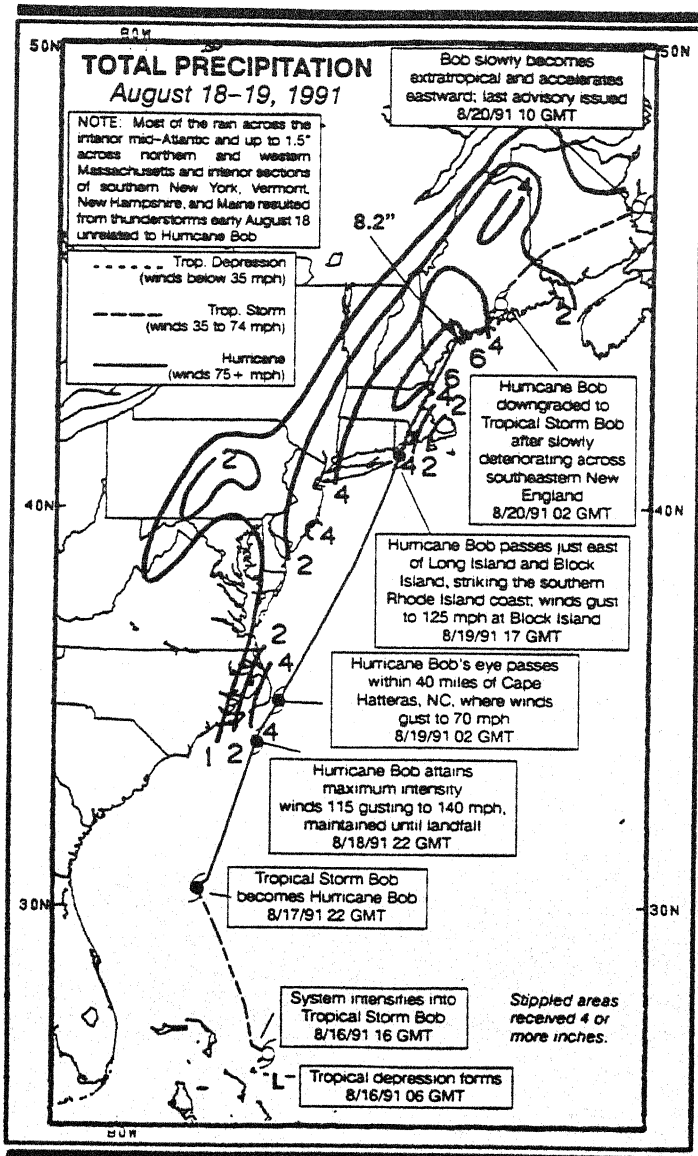
JULY 1991 GLOBAL CLIMATE ANOMALIES

WEEKLY CLIMATE BULLETIN

No. 91/33 **Washington, DC** **August 17, 1991**



Tropical Storm Bob developed from a tropical depression just northeast of the Bahamas on Friday and strengthened to hurricane force on Saturday as it moved northwestward. The hurricane then turned to the north and grazed the North Carolina coast. The eye of the storm missed Cape Hatteras, NC, by 40 miles, bringing over five inches of rain and 70 mph wind to the Outer Banks Sunday evening, while the storm center, out at sea packed sustained winds of 115 mph. Thunderstorms accompanying the hurricane spawned several tornadoes along the North Carolina coast. Bob then raced rapidly northeastward, causing some minor flooding along the mid-Atlantic coast with heavy rain and high surf. Near mid-day Monday, the storm passed over Block Island, RI and into eastern sections of Rhode Island and Massachusetts, causing considerable damage with winds gusting to 120 mph and torrential rains of three to six inches. The storm slowly weakened below hurricane strength as it move through Maine and into Canada on Tuesday, drenching portions of southeastern Maine with over seven inches of rain.

UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE–NATIONAL METEOROLOGICAL CENTER
CLIMATE ANALYSIS CENTER

WEEKLY CLIMATE BULLETIN

This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

- *Highlights of major climatic events and anomalies.*
- *U.S. climatic conditions for the previous week.*
- *U.S. apparent temperatures (summer) or wind chill (winter).*
- *Global two–week temperature anomalies.*
- *Global four–week precipitation anomalies.*
- *Global monthly temperature and precipitation anomalies.*
- *Global three–month precipitation anomalies (once a month).*
- *Global twelve–month precipitation anomalies (every three months).*
- *Global three–month temperature anomalies for winter and summer seasons.*
- *Special climate summaries, explanations, etc. (as appropriate).*

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Climate Analysis Center via the Global Telecommunications System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

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GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF AUGUST 17, 1991

1. Central and East-Central United States:

A VERY DRY WEEK.

Most locations measured less than 10 mm as short-term moisture deficits began rising across the Tennessee Valley and parts of Alabama and Mississippi. Only scattered locations in central Kentucky, southeastern Indiana, and portions of Ohio recorded 50–85 mm. Most locations have experienced 50–100 mm below normal rainfall since early July [12 weeks].

2. Southern Plains and Central High Plains:

DOWNPOURS FLOOD PARTS OF TEXAS WHILE MONSOONAL CLOUDBURSTS CONTINUE.

Many locations across north-central and northeastern Texas received 100–235 mm of rain, generating severe localized river and street flooding, according to press reports. Farther west, scattered monsoonal thundershowers dropped 35–105 mm of rain on parts of western Texas, eastern New Mexico, and eastern Colorado, where several stations have measured 2 to 5 times the normal rainfall since late July [7 weeks].

3. Northern Senegal and Southwestern Mauritania:

SIGNIFICANT DRYNESS RESTRICTED TO EXTREME NORTHWESTERN SAHEL.

Another week of moderate to heavy rains ended dryness across Burkina Faso and East-Central Sudan, but little or no rains allowed deficits to grow through northern Senegal and southwestern Mauritania, where six-week departures of 90–130 mm are common [9 weeks].

4. Southeastern Europe:

SCATTERED HEAVY RAINS REPORTED.

Most of central Romania, adjacent Moldavia, southeastern and northwestern Yugoslavia, and Austria received 30–60 mm of rain. Since early July, surpluses of 100–185 mm have accumulated across parts of Romania, Yugoslavia, Hungary, Czechoslovakia, and southern Germany, with departures as high as +265 mm affecting portions of Austria [4 weeks].

5. Western India and East-Central Pakistan:

LITTLE OR NO RAINFALL MEASURED.

A weak monsoonal season continued as only 10–20 mm dampened central and western Gujarat while little or no rain fell on the remainder of the affected areas. Deficits up to 190 mm have accumulated since early July despite sporadic flooding farther east [11 weeks].

6. Luzon, South-Central China, Northern Vietnam and Laos, and Eastern Thailand:

TYPHOON FRED DRENCHES REGION.

Early in the week, a tropical depression moved across Luzon, bringing 200–385 mm of rain to eastern parts of the island as daily rainfall totals reached 240 mm. As the system trekked northeastward, the depression rapidly strengthened into Typhoon Fred, which brought 185 kph winds and up to 263 mm of rain to south-central China and Hainan as the eye of the storm moved through Hainan Strait. The storm continued westward, eventually making landfall along the northern coast of Vietnam and moving into northern Laos and eastern Thailand before dissipating. The aforementioned locations recorded 115–250 mm of rain, much of which resulted from the storm (see Page 6) [Episodic Event].

7. Eastern Heilungjiang and Southeastern Soviet Union:

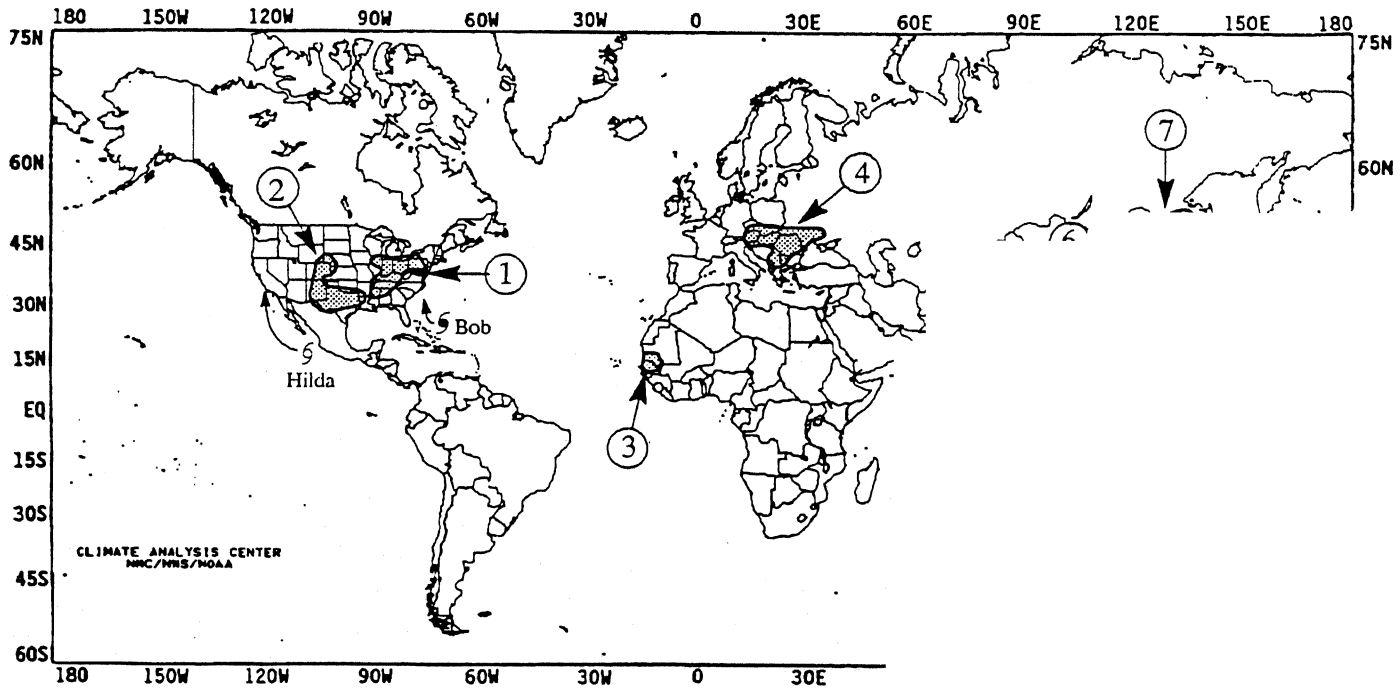
ANOTHER DAMP WEEK.

Drier weather prevailed across the Koreas and the Yangtze River Valley, where significant moisture surpluses decreased. Farther north, however, moderate to heavy rains (40–110 mm) again prevailed across eastern Heilungjiang and the southeastern Soviet Union, where spotty six-week surpluses of 110–260 mm have accumulated [11 weeks].

8. South Island, New Zealand:

PROLONGED WET CONDITIONS OBSERVED.

During the last five weeks, 330–555 mm of precipitation have pounded the northeastern coast of South Island, which represents 100–250 mm more than normal. Last week, 90–170 mm soaked the region, allowing moisture surpluses to continue growing [5 weeks].



EXPLANATION

TEXT: Approximate duration of anomalies is in brackets. Precipitation amounts and

MAP: Approximate locations of major anomalies and episodic events are shown. See temperature anomalies, four week precipitation anomalies, long-term anoma

UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF AUGUST 11 - 17, 1991

Strong thunderstorms bearing heavy rains pounded the southern Plains and Southeast. Over nine inches of precipitation was recorded in north-central Texas while up to 8 inches drenched northwestern South Carolina. The heavy rains swelled rivers in northern Texas, Georgia, South Carolina and northern Florida. Brief, but torrential rains caused localized flooding in northeast Texas, washing out several roads and leaving several others submerged in two feet of water. Elsewhere, scattered monsoonal thunderstorms generated heavy rains in portions of the Southwest and southern Rockies. Up to 1.5 inches of rain fell in 35 minutes at Douglas, AZ while heavy rains also caused flooding near Albuquerque, NM. Strong thunderstorms battered portions of Nevada, spawning over half a dozen water spouts on Lake Tahoe. Tornadoes were reported from the Rockies to the Ohio Valley. A tornado damaged two planes at the Canton, OH airport. Farther west, the remnants of Tropical Storm Hilda spread into northern and central California, producing rare summer showers. Although precipitation totals were relatively light some locations recorded more than four times the normal August rainfall. Stockton, CA established a daily rainfall record on Tuesday when 0.05 inches was measured. It was the first occurrence of rain for the date since records began in 1906. Meanwhile, the second tropical storm of the season in the Atlantic developed in the Bahamas on Friday. The storm reached hurricane strength on Saturday as it moved northward paralleling the East Coast (see front cover). In Alaska, heavy rains soaked the southern part of the state with Yakutat recording 10 inches of precipitation.

The week commenced with a stationary front parked across the southern tier of states. Severe weather erupted along and to the south of the front, generating heavy rains and strong wind gusts. Nearly 3 inches of rain doused Savannah, GA while wind gusts reached 60 mph at Dekalb Airport in Atlanta, damaging four planes. Torrential rains also fell across the Carolinas and much of northern Texas, causing localized flooding. Fort Worth, TX was hardest hit where flooding claimed the life of one person and left many roads under water. To the west, heavy rains swelled the Nambe River in New Mexico, claiming the lives of two people as raging waters swept away the car they were riding in, according to press reports. In southern Alaska, heavy rain and glacial melt raised water levels on the Resurrection River and several smaller streams. Meanwhile, record heat engulfed parts of the Far West, northern Rockies, upper Midwest, and Great Lakes as readings soared above 90°F as far north as International Falls, MN.

During the last half of the week, the stationary front across the southern U.S. continued to spawn severe weather. Heavy rain fell from the southern Plains to the Southeast, causing more localized flooding. Some storms were accompanied by destructive wind gusts downing trees and power lines from Oklahoma to North Carolina. Meanwhile, unusually cool conditions affected the deep South on Thursday. Record low maximum temperatures were reported in Georgia and Louisiana as highs only reached into the seventies. On Friday, tropical storm Bob was born in the Bahamas and trekked toward the south Atlantic coast on Saturday where it was upgraded to a hurricane. Farther north, severe weather developed across portions of the Great Lakes and Ohio Valley. Tornadoes touched down in Michigan and Ohio, causing some damage. In addition, strong wind gusts contributed to the collapse of a wooden building, injuring more than two dozen people.

According to the River Forecast Centers, the greatest weekly totals (more than 2 inches) occurred from the southern Plains to the Southeast, and scattered locations in the Ohio Valley, upper Midwest, central Plains, central and southern Rockies, western Oregon, and southern Alaska (Table 1). Light to moderate amounts were recorded across most of New England, portions of the mid-Atlantic, Ohio and Mississippi Valleys, Great Lakes, Southwest, and the remainders of the Great Plains, central and southern Rockies, and most of Alaska. Little or no precipitation fell in extreme northern sections of New England and the mid-Atlantic, the central Appalachians, Tennessee Valley, most of Mississippi, central Illinois, extreme southern Texas, northern Rockies, Far West, northern Alaska, and most of the Hawaiian Islands.

Unusually warm conditions prevailed across the northern tier of states, Florida, southern Texas, and most of the Far West (Table 2). Weekly departures between +5°F and +8°F were observed from the parts of the West coast to northern Maine. Departures of +2°F to +4°F were common across the Great Basin, northern and central Rockies eastward to southern New England. Abnormally mild conditions also persisted across most of Alaska. Weekly departures reached to +9°F on Annette Island in the southeast part of the state while departures at or above +3°F were observed from Juneau to Kotzebue.

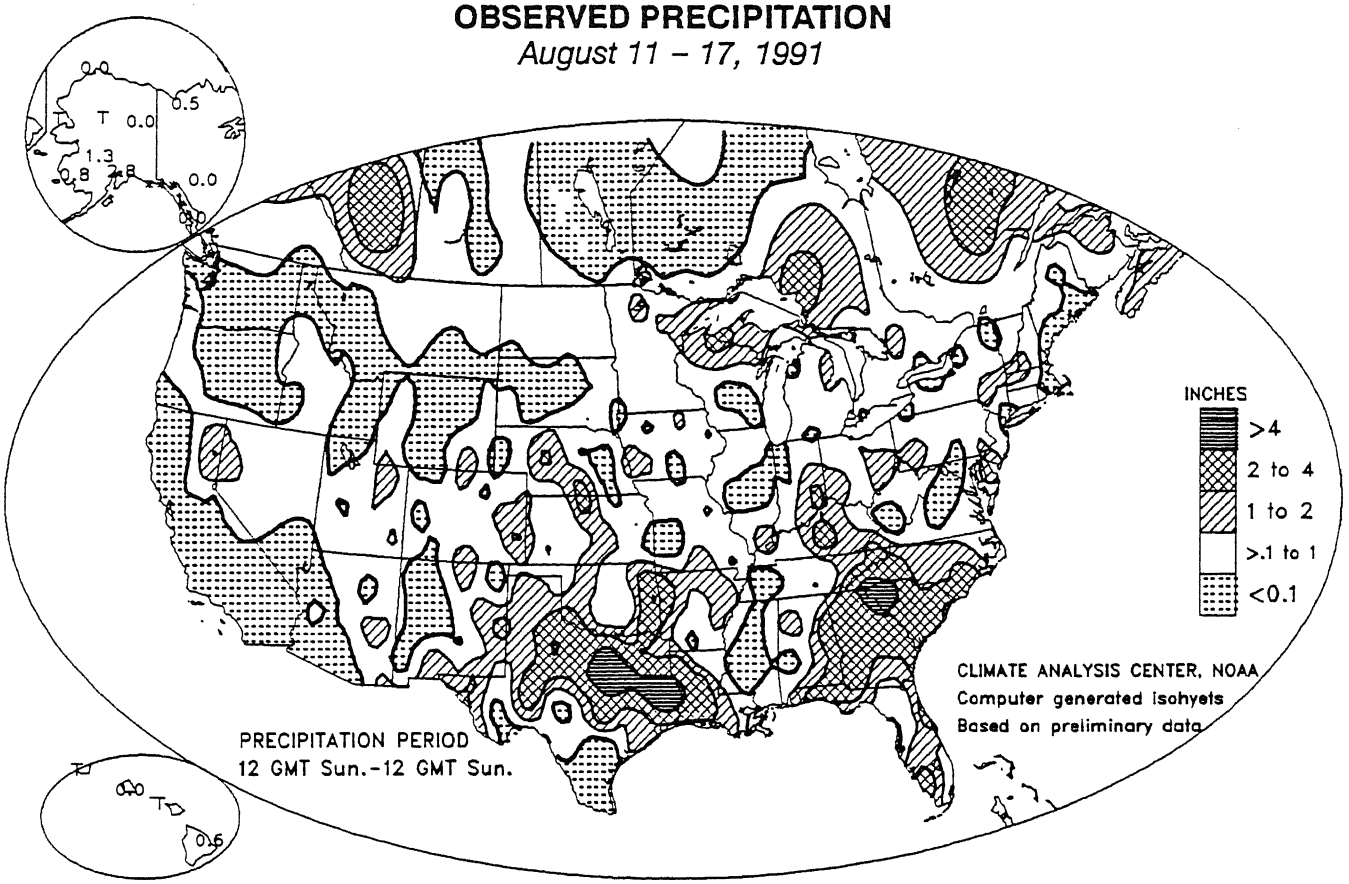
Unseasonably cold weather dominated from the southern Rockies to the mid-Atlantic with weekly departures between -4°F and -8°F from Texas to Virginia (Table 3). Near to slightly below normal temperatures were reported across much of the southern Rockies and Great Basin, and portions of southern and northern California. In Alaska, cooler than normal conditions were limited to just a few scattered locations across the state with weekly departures of -2°F observed at Adak, AK.

TABLE 1. *SELECTED STATIONS WITH 2.50 OR MORE INCHES OF PRECIPITATION DURING THE WEEK OF AUGUST 11 - 17, 1991*

STATION	TOTAL (INCHES)	STATION	TOTAL (INCHES)
YAKUTAT, AK	10.00	FLORENCE, SC	2.84
STEPHENVILLE, TX	6.75	CLOVIS/CANNON AFB, NM	2.81
CORDOVA/MILE 13, AK	6.41	WILMINGTON, NC	2.79
ANDERSON, SC	6.41	MACON, GA	2.78
LUFKIN, TX	5.74	FAYETTEVILLE, AR	2.78
FT WORTH/MEACHAM, TX	5.72	MACON/WARNER-ROBINS AFB, GA	2.76
FORT WORTH/CARSWELL AFB, TX	5.33	ANCHORAGE, AK	2.76
DAYTONA BEACH, FL	4.39	BOSSIER CITY/BARKSDALE AFB, LA	2.70
WACO, TX	3.91	AUGUSTA, GA	2.69
SAVANNAH, GA	3.76	SHREVEPORT, LA	2.55
VALDEZ, AK	3.68	ALBANY, GA	2.53
AUSTIN, TX	3.63	ALEXANDRIA/ENGLAND AFB, LA	2.52
GREENVILLE, SC	3.62	ATHENS, GA	2.52
CHARLESTON, SC	2.94	JACKSONVILLE/NEW RIVER MCAS, NC	2.51

OBSERVED PRECIPITATION

August 11 – 17, 1991



DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)

August 11 – 17, 1991

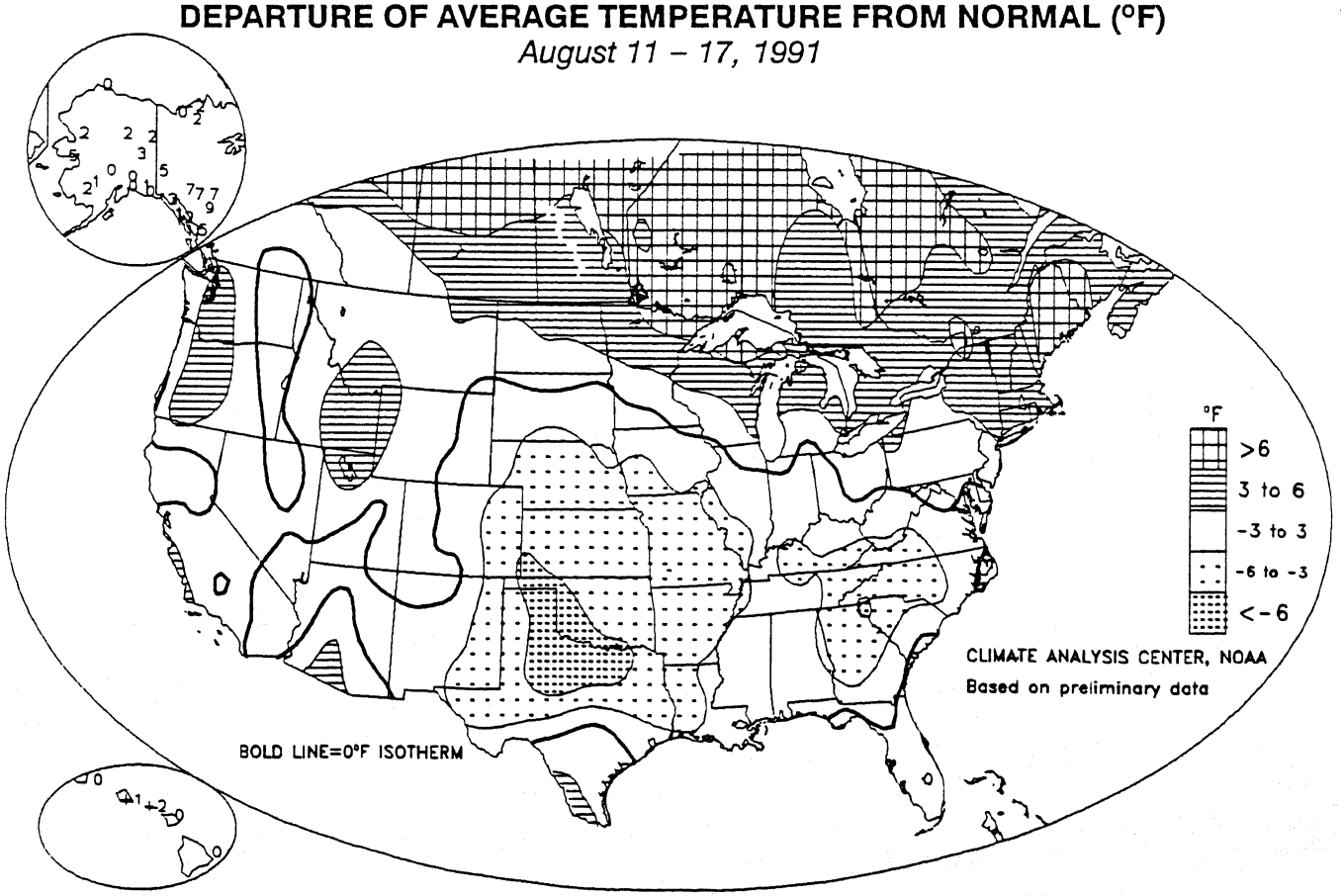
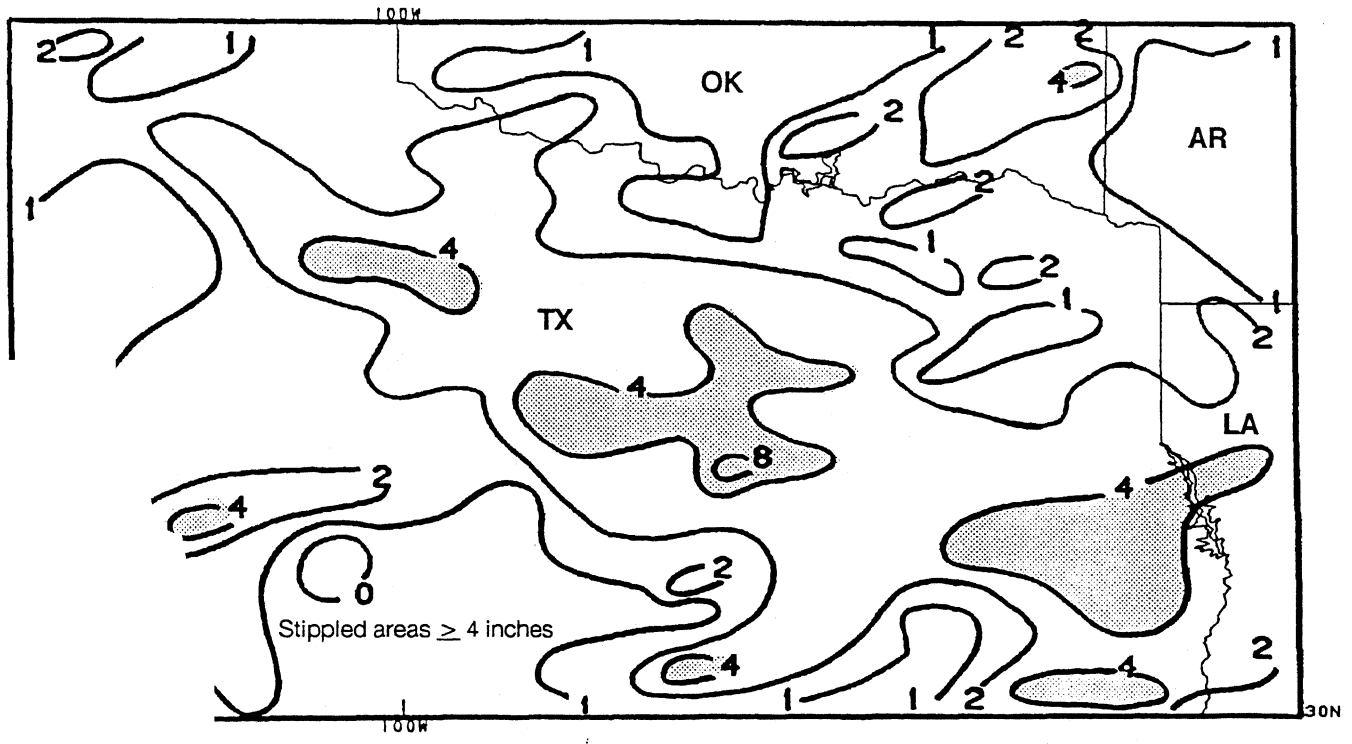


TABLE 2. *SELECTED STATIONS WITH TEMPERATURES AVERAGING 5.5°F OR MORE ABOVE NORMAL FOR THE WEEK OF AUGUST 11 - 17, 1991*

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
ANNETTE ISLAND, AK	+8.9	67.5	MASSENA, NY	+6.4	73.7
HANCOCK/HOUGHTON CO, MI	+8.4	72.3	AUGUSTA, ME	+6.2	74.4
CARIBOU, ME	+7.8	70.9	HELENA, MT	+6.1	72.7
INTERNATIONAL FALLS, MN	+7.6	71.5	PORTLAND, ME	+6.0	73.1
EASTPORT, ME	+7.6	70.7	HOULTON, ME	+6.0	70.1
MARQUETTE, MI	+7.4	70.4	BURLINGTON, VT	+5.9	73.6
PELLSTON, MI	+7.2	71.6	KETCHIKAN/INTL, AK	+5.9	64.9
BANGOR, ME	+7.1	74.1	RUMFORD, ME	+5.8	71.3
ALPENA, MI	+6.5	72.0	DULUTH, MN	+5.8	69.7

TABLE 3. *SELECTED STATIONS WITH TEMPERATURES AVERAGING 5.0°F OR MORE BELOW NORMAL FOR THE WEEK OF AUGUST 11 - 17, 1991*

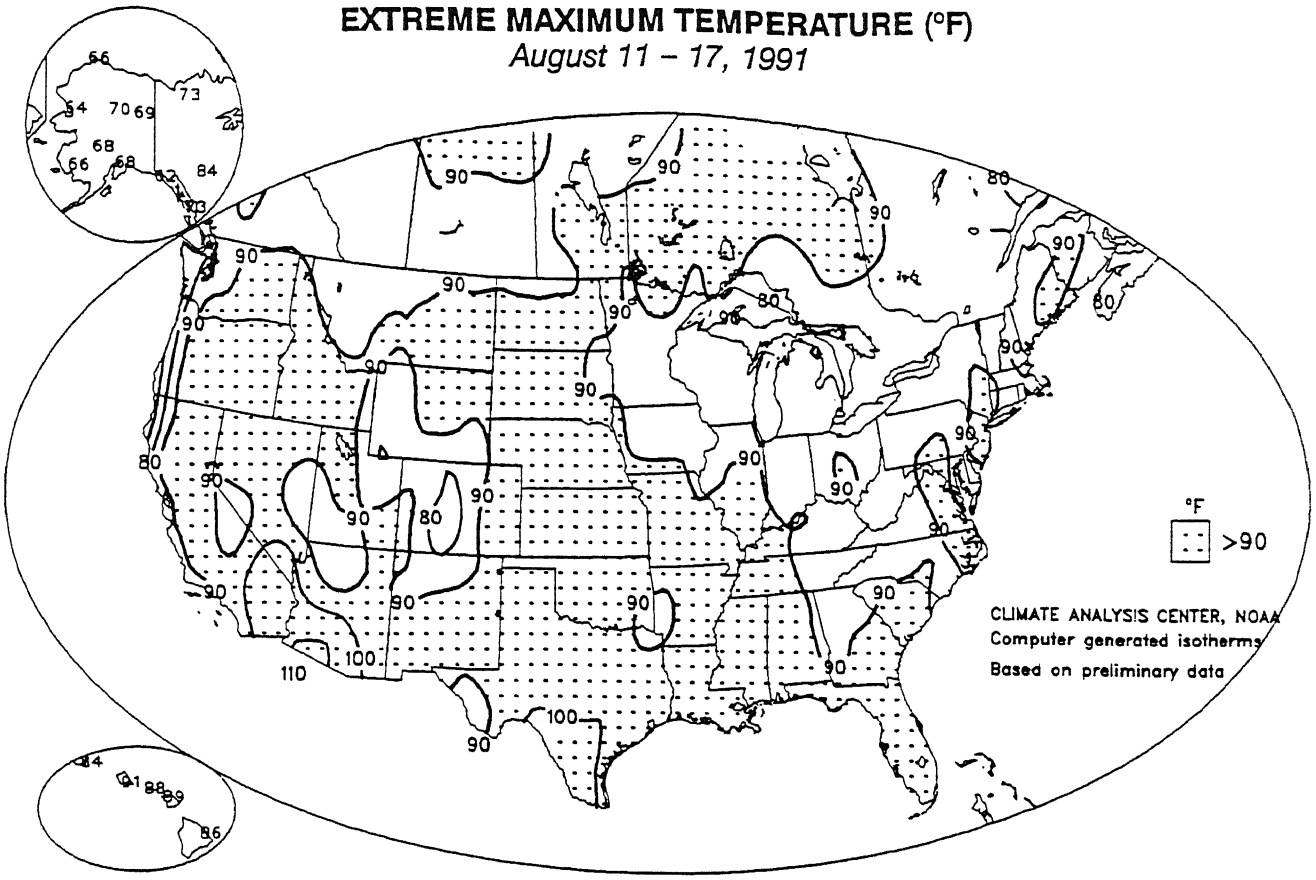
STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
ABILENE, TX	-8.4	75.2	TUCUMCARI, NM	-5.9	71.8
WICHITA FALLS, TX	-8.0	77.0	ENID/VANCE AFB, OK	-5.9	76.9
FT. SILL/HENRY POST AAF, OK	-6.8	76.9	SAN ANGELO, TX	-5.5	78.0
DALLAS/LOVE FIELD, TX	-6.5	79.6	ATHENS, GA	-5.4	73.6
ANDERSON, SC	-6.4	73.2	RUSSELL, KS	-5.4	73.6
HOBART, OK	-6.4	76.3	GRAND ISLAND, NE	-5.2	70.2
DALLAS-FORT WORTH, TX	-6.4	79.1	ASHEVILLE, NC	-5.0	68.3
GAGE, OK	-6.2	74.6	BRISTOL, TN	-5.0	69.6
ELKHART, KS	-6.1	71.9	CLOVIS/CANNON AFB, NM	-5.0	71.8
MEACHAM, OR	-6.0	56.3	GREENVILLE, SC	-5.0	73.1



otal Precipitation Across the South-Central United States, August 11 - 17, 1991.
nly for 1, 2, 4 and 8 inches. Showers and thunderstorms soaked much of central and eastern h amounts up to 9.2 inches reported. The heavy rains generated localized flooding and River to flood stage (through Dallas-Fort Worth). Major street flooding was reported across especially near the Fort Worth area.

EXTREME MAXIMUM TEMPERATURE (°F)

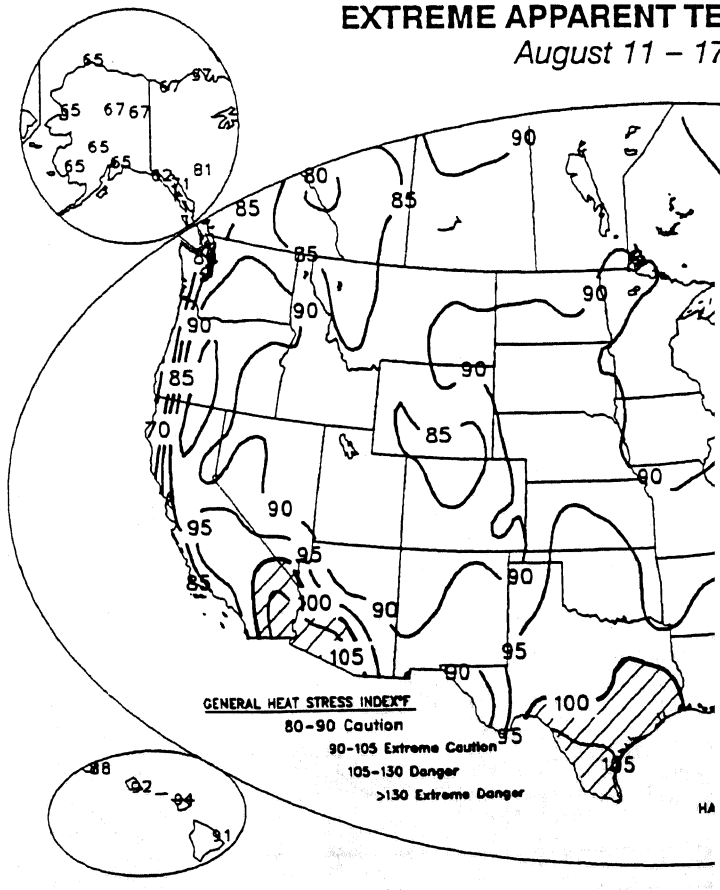
August 11 – 17, 1991



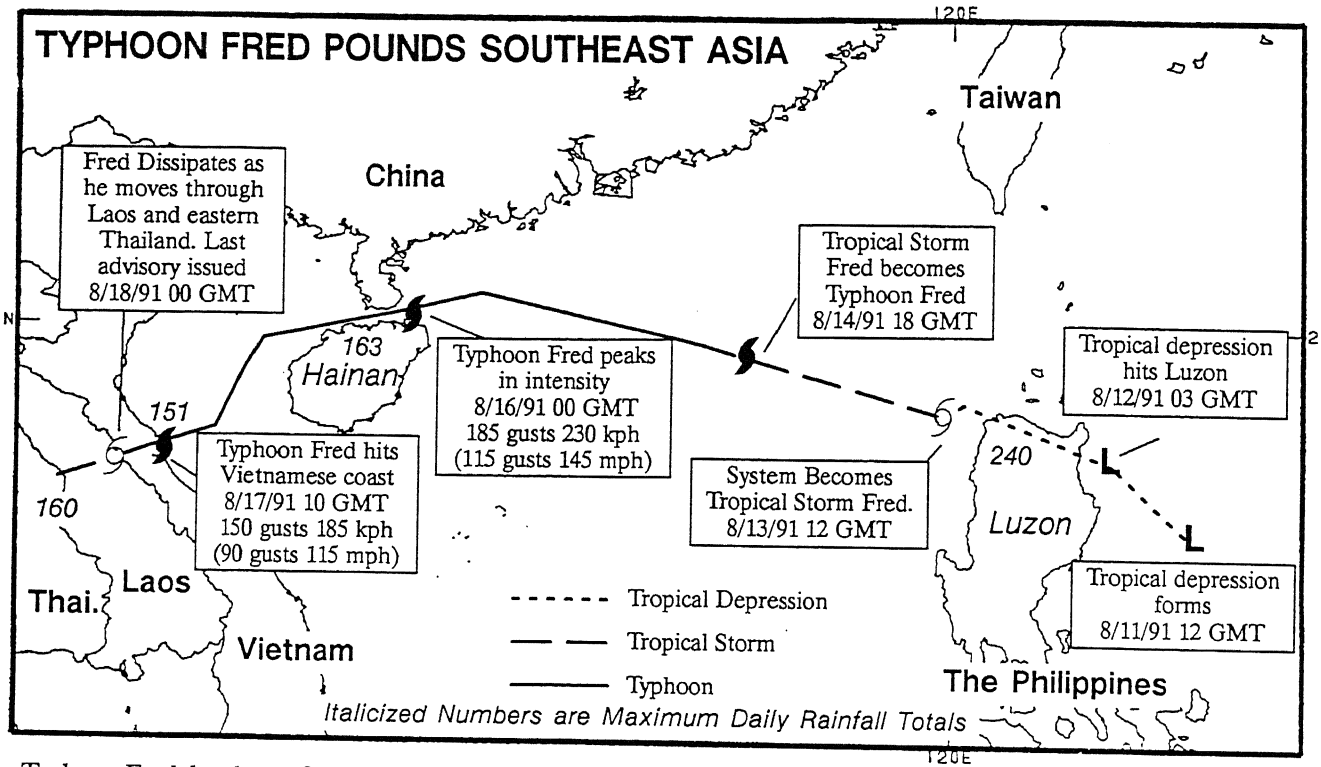
gh temperatures greater than 100°F were limited to the desert Southwest and the lower Rio Grande Valley (top) as unseasonably cool nditions extended from the central and southern Plains to the Southeast and mid-Atlantic (page 3). Unusually warm weather prevailed across thern Ontario, where temperatures reached into the nineties, while a combination of heat and humidity produced triple digit apparent nperatures in the desert Southwest, southern Texas, Florida, southern Georgia and a portion of the lower Mississippi Valley (bottom).

EXTREME APPARENT TEMPERATURE (°F)

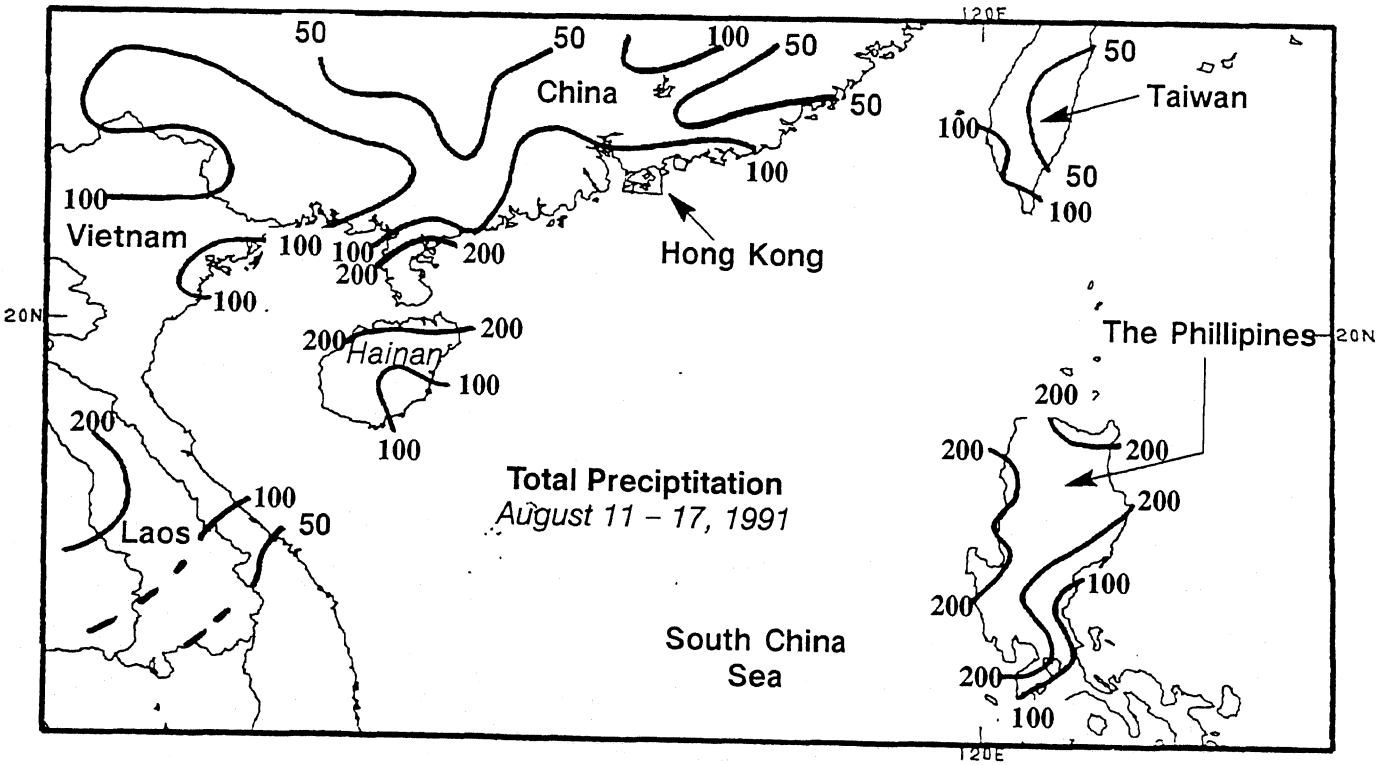
August 11 – 17, 1991



GLOBAL CLIMATE HIGHLIGHTS FEATURE

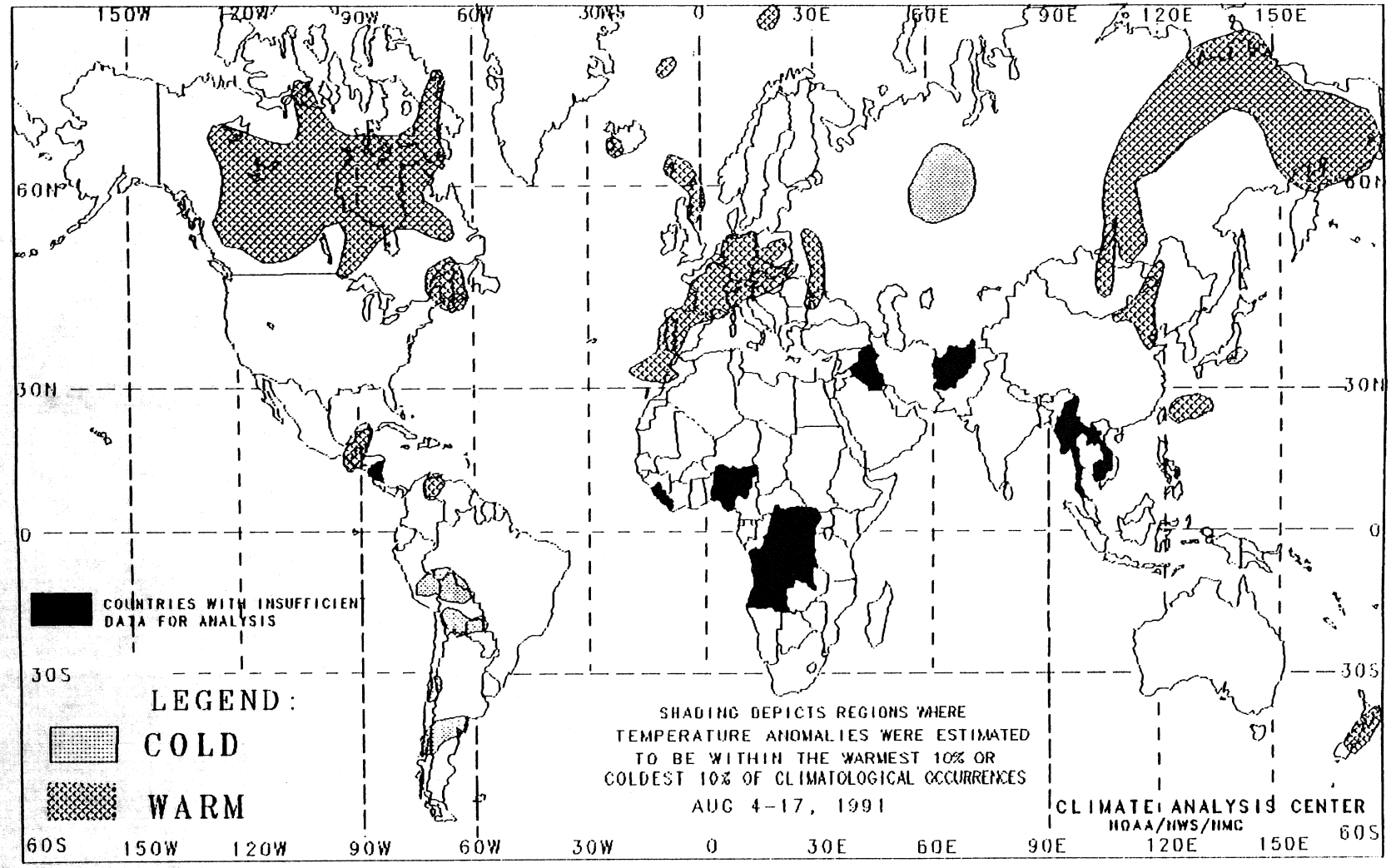


Typhoon Fred developed from a tropical depression that swept through northern Luzon, dousing the region with up to 385 mm of rain. While crossing the South China Sea, the storm generated high waves which sank a barge 65 miles east of Hong Kong, taking at least 18 lives. The eye of the typhoon proceeded eastward through Hainan Strait, battering the island province of Hainan and adjacent south-central China with sustained winds of 185 KPH and gusts up to 235 KPH. Haikou, capital of Hainan at the northern tip of the island, was pounded by the storm as 5,750 houses collapsed and 7 people died, according to press reports. The storm also caused extensive damage in neighboring Guangdong province to the north. Fred then moved across the Gulf of Tonkin and smashed into northern Vietnam, across Loas, and into eastern Thailand as a tropical storm before dissipating. Typhoon Fred was the fourth typhoon to hit southern China since early July, while a fifth, Typhoon Ellie, moved westward across Okinawa at week's end.



2–WEEK GLOBAL TEMPERATURE ANOMALIES

AUGUST 4 – 17, 1991



The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty–four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

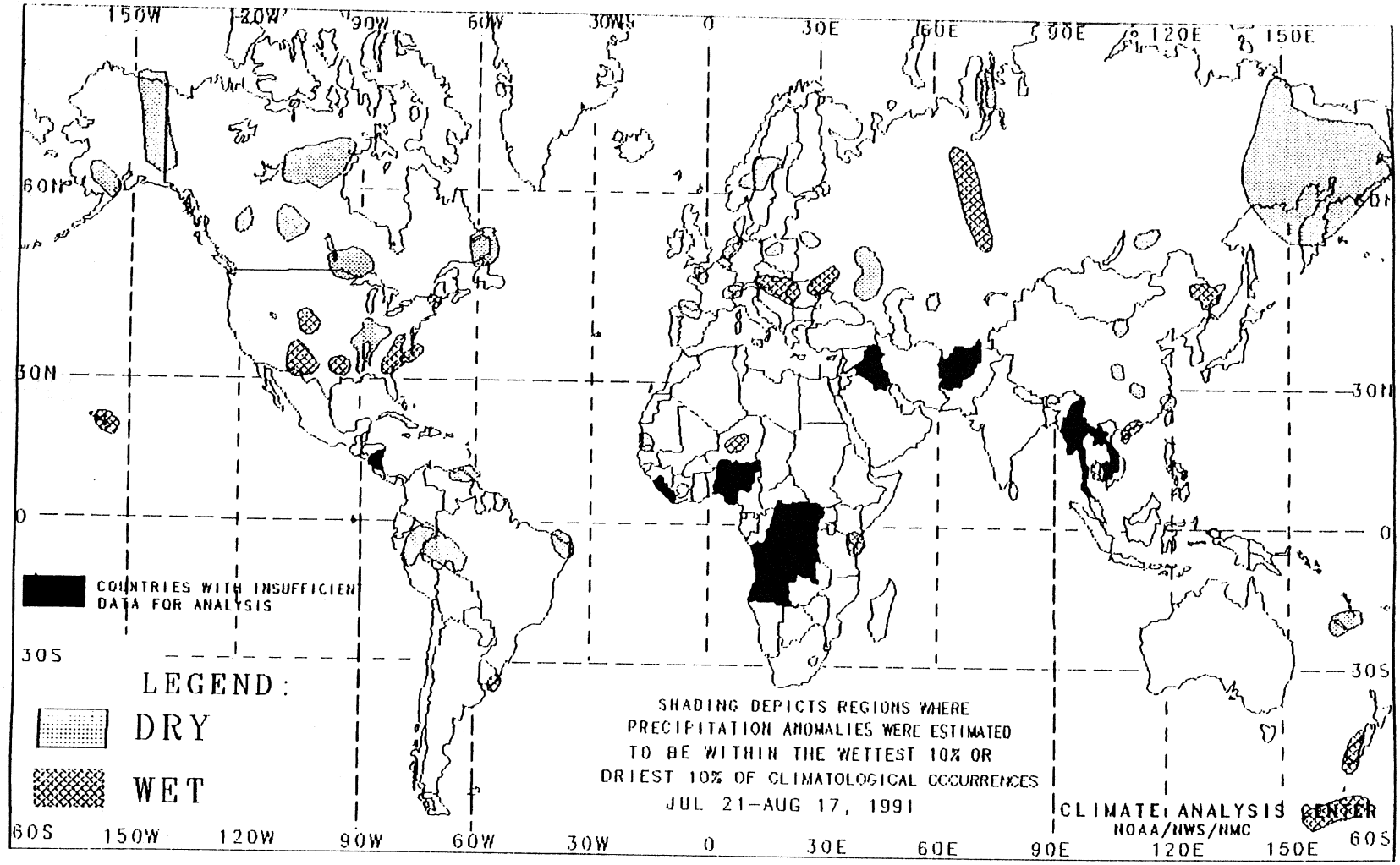
Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

This chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

4–WEEK GLOBAL PRECIPITATION ANOMALIES

JULY 21 – AUGUST 17, 1991



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

EL NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC ADVISORY 91/05

issued by

DIAGNOSTICS BRANCH
CLIMATE ANALYSIS CENTER, NMC

AUGUST 13, 1991

During the last several months, the trend in SST in the region 160°E eastward to 160°W (Fig. 1a), has been rather steady in indicating the development of a warm episode. The rather sharp increase in sea surface temperature (SST) anomalies in the eastern tropical Pacific, that occurred from April to June 1991 (Fig. 1b), coincided with a period of low-level westerly anomalies throughout the equatorial Pacific and a deepening thermocline in the eastern equatorial pacific. Consistent with these features, the Southern Oscillation Index (SOI) has been negative for the last several months. However, enhanced persistent tropical convection has not yet become established in the central equatorial Pacific.

The June 1991 eruptions of Mt. Pinatubo in the northern Philippines have resulted in an extensive aerosol cloud in the stratosphere which is affecting the satellite estimates of SST. The cloud completely encircled the earth by the middle of July and at the end of the month was confined to the tropics (20°N – 30° S). During July, the aerosol cloud interfered with the satellite sea surface temperature retrievals, resulting in negative satellite SST biases of up to 2°C. In addition, the presence of the aerosol has increased the area classified as cloud using visible imagery, thus resulting in a dramatic drop in the number of daytime retrievals. The number of nighttime retrievals has not been significantly affected. The April 1982 eruptions of El Chichon in Mexico produced a smaller aerosol cloud, which also resulted in negative biases in the satellite SST retrievals which lasted through 1984.

The TOGA/CAC SST (blended) analysis technique uses the shape of the higher
and calibrates the SSTs utilizing observations from buoys and ships
ice. Thus, the blended analysis is not substantially affected by the p

The SST anomaly field for July 1991 is shown in Fig. 2. This p
during June. In July, all three Niño regions had anomalies near 1°C

As the Northern Hemisphere warm season comes to a close, t
equatorward. The transition seasons (March-May and Septembe
evolution of warm episodes. During those seasons, convection is
location and, thus, it may experience rather large longitudinal shifts,
SST pattern and the intensity and phase of the 30-60 day (intr
oscillations, at times, play an important role in the establishment of
central equatorial Pacific.

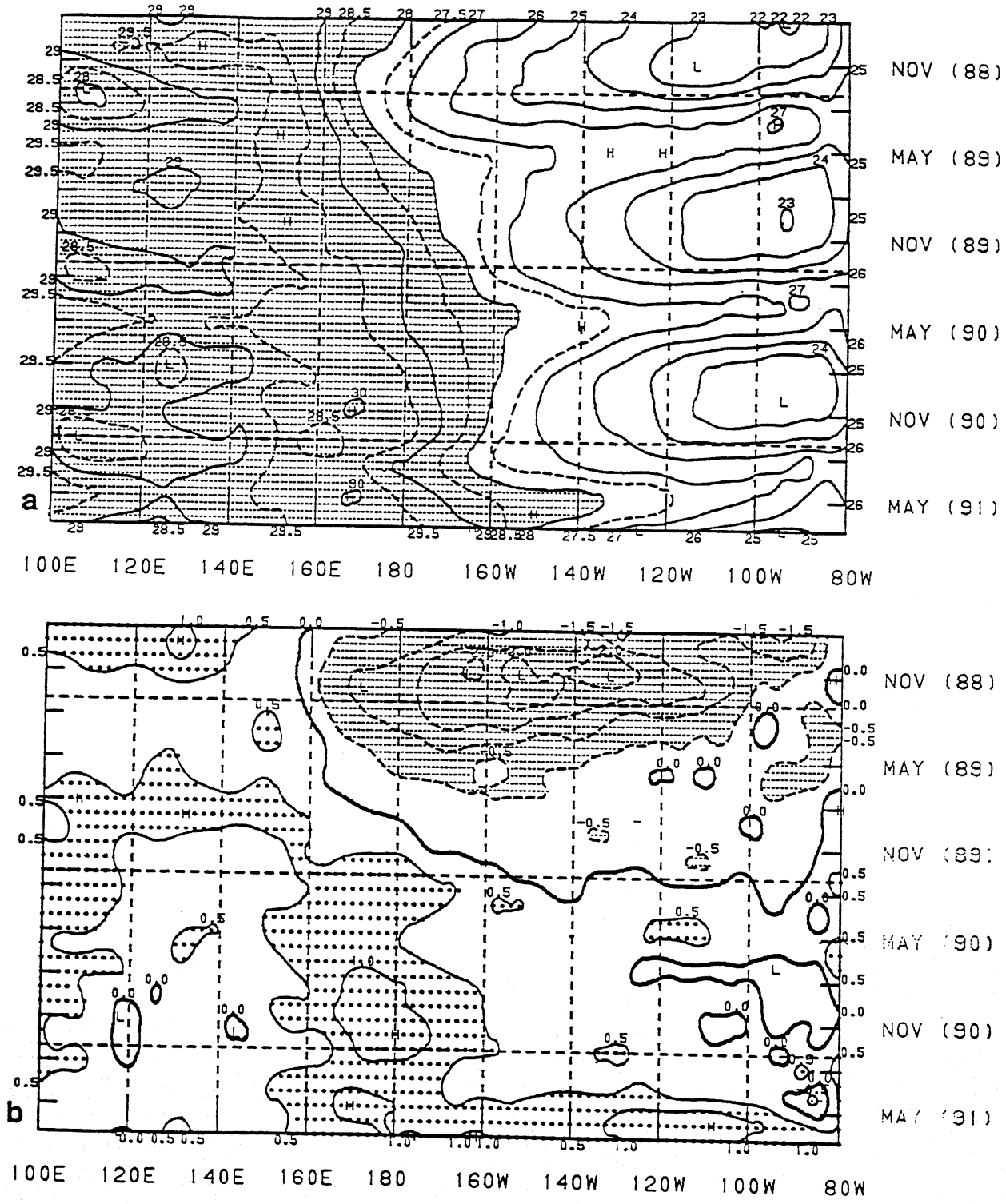


FIGURE 1. Time–Longitude Section of Monthly Sea Surface Temperature, a) Mean and b) Anomalous, for 5°N–5°S. *Contour interval is 1°C and 0.5°C, respectively. SST values greater than 28°C and anomalies less than –0.5°C are shaded. Stippled areas indicate anomaly values greater than 0.5°C. Anomalies are computed based on the COADS/ICE climatology* (Reynolds, 1988, *J. Climate*, 1, 75-76).

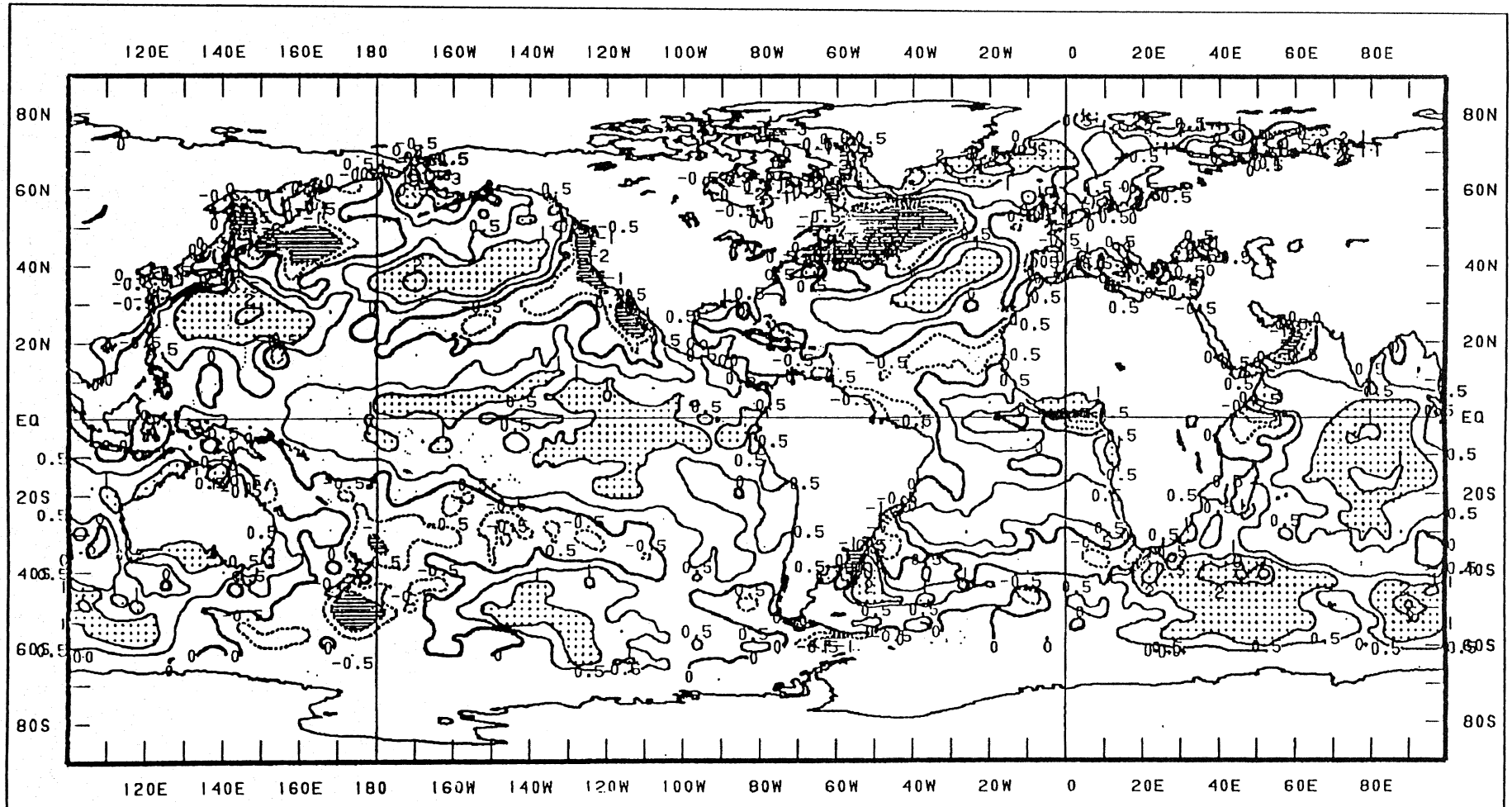


FIGURE 2. Blended Sea Surface Temperature Anomaly For July 1991. *The contour interval is 1°C and negative contours are dashed. the 0°C contour has been darkened. Anomalies less than −1°C are stippled. Additional anomaly contour of ±0.5°C are shown.*

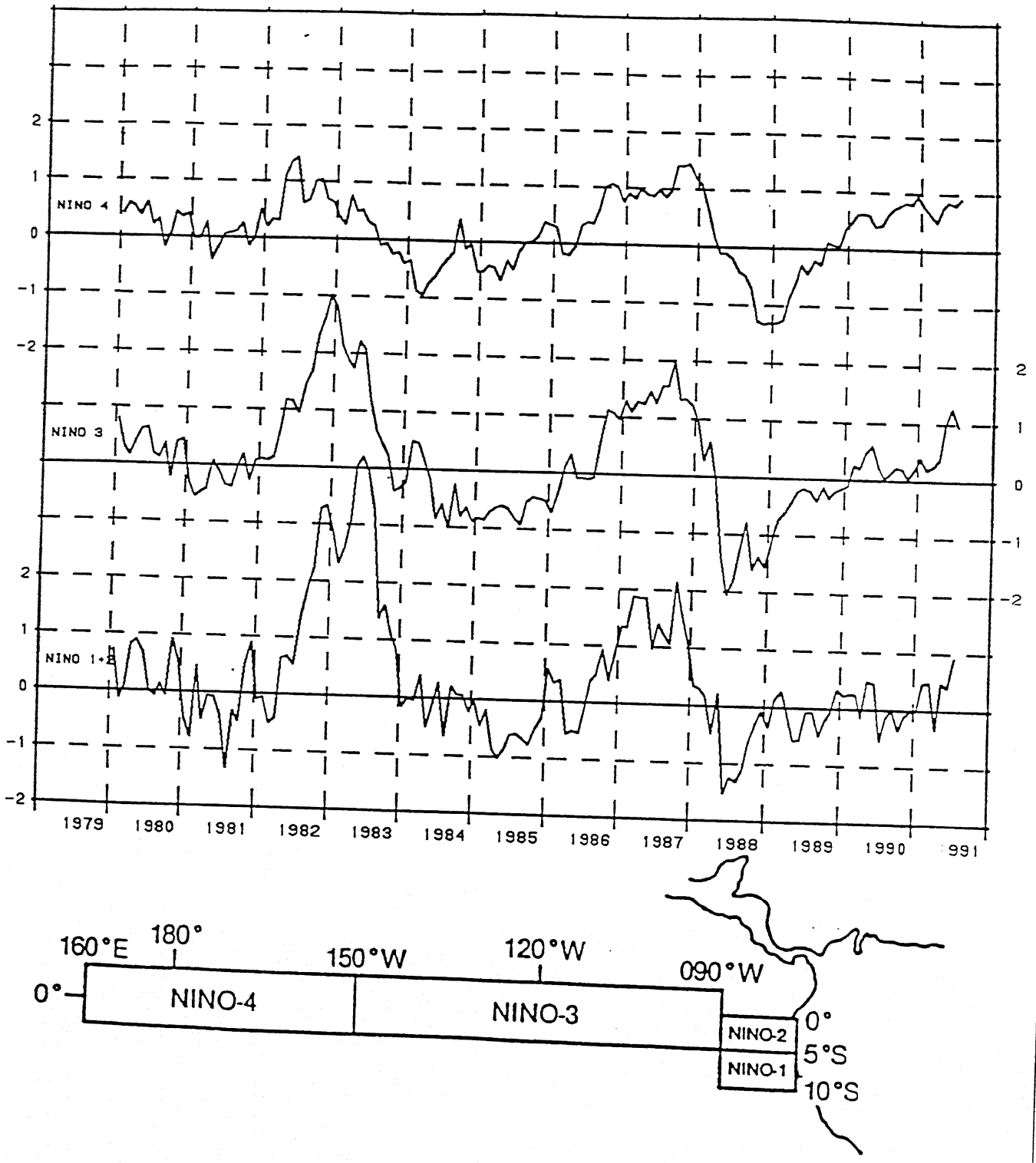
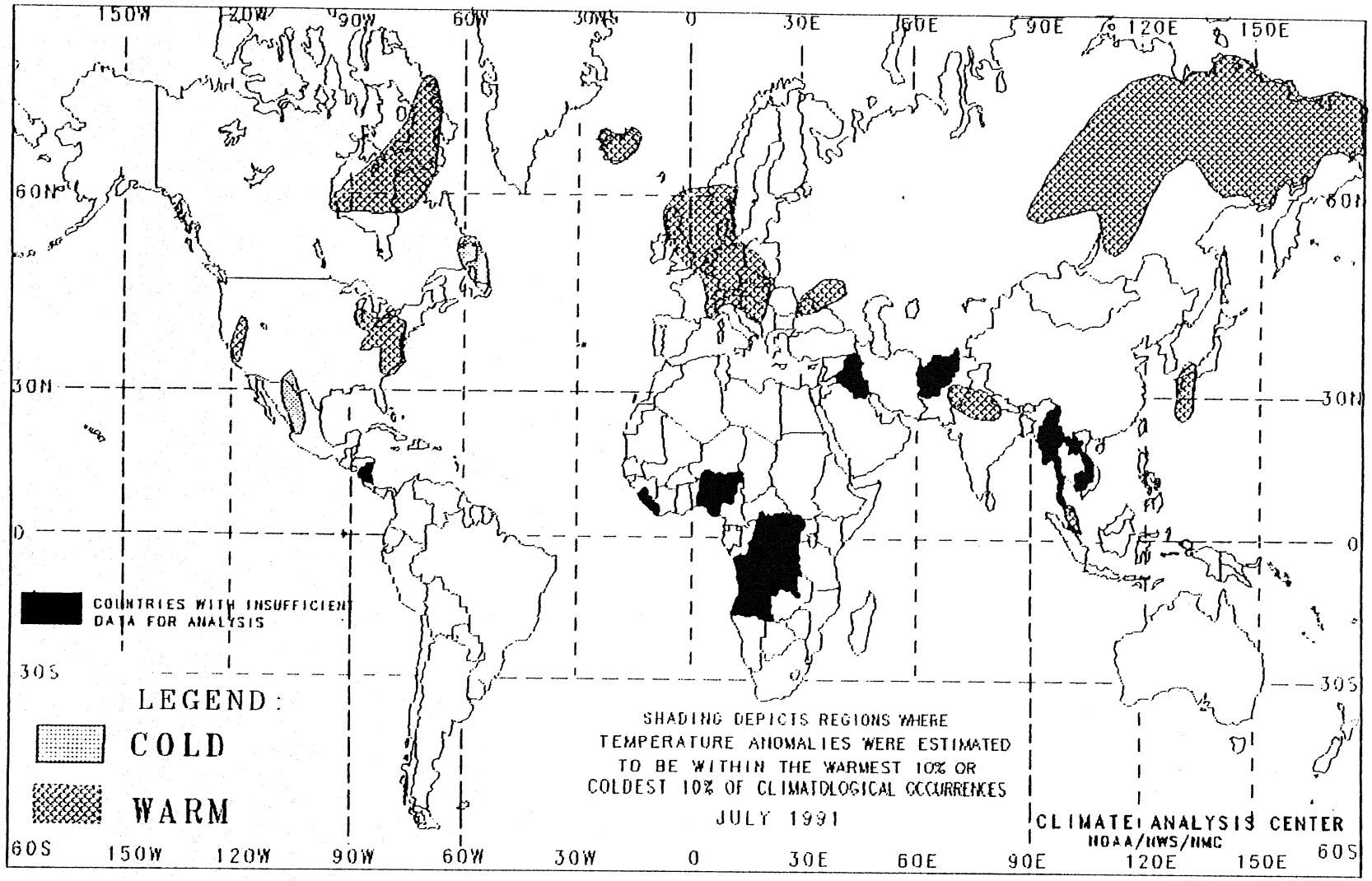


FIGURE 3. Equatorial Pacific Sea Surface Temperature Anomaly Indices (°C; for the areas indicated at the bottom of the figure). *Nino 1+2 is the average over Nino 1 and Nino 2 areas. Anomalies are computed with respect to the COADS/ICE climatology.*

MONTHLY GLOBAL TEMPERATURE ANOMALIES

JULY 1991



The anomalies on this chart are based on approximately 2500 observing stations for which at least 26 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warM anomalies.

Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

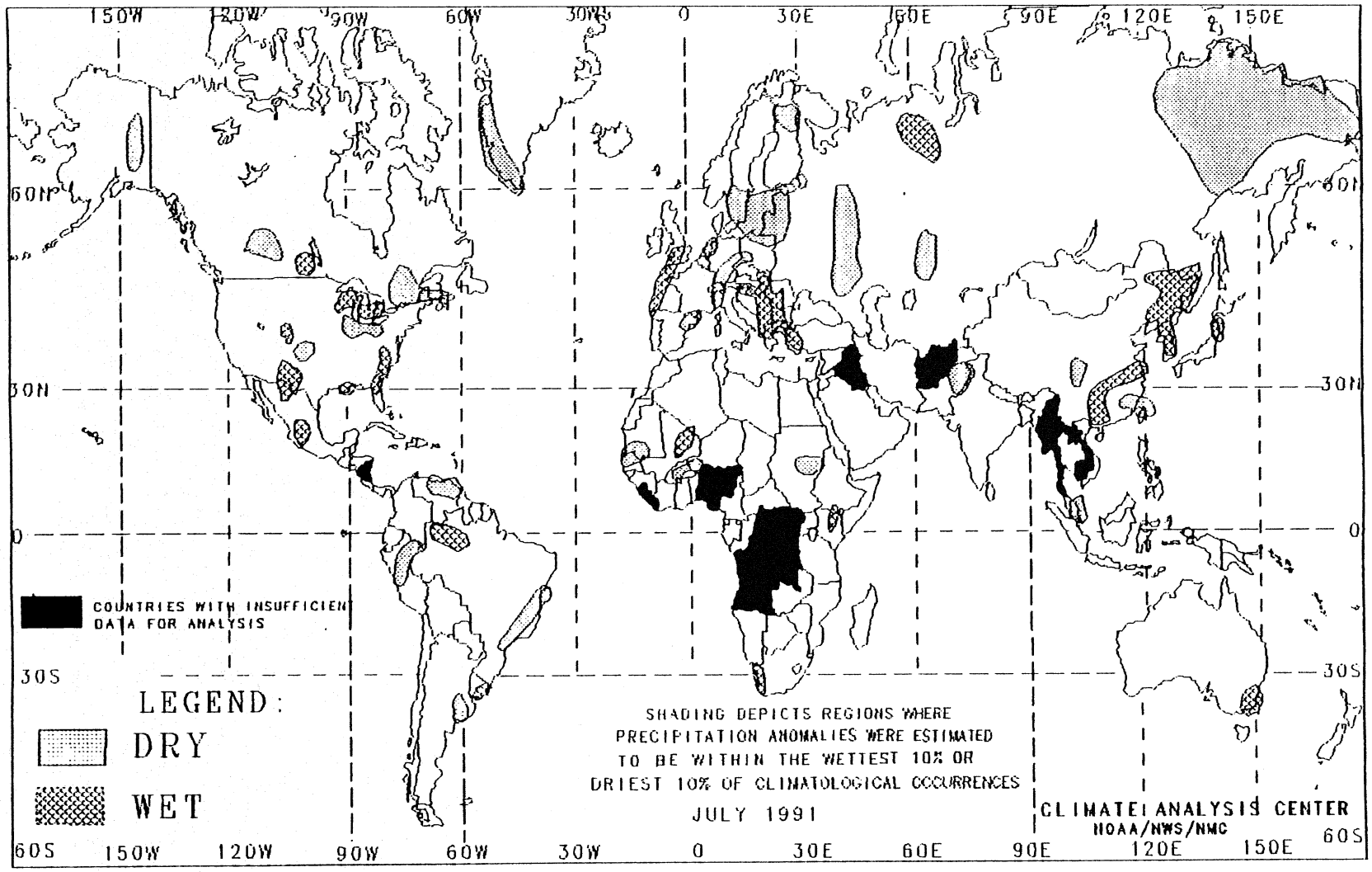
In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

This chart shows general areas of one month temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

PRINCIPAL TEMPERATURE ANOMALIES

JULY 1991

REGIONS AFFECTED	TEMPERATURE AVERAGE (°C)	DEPARTURE FROM NORMAL (°C)	COMMENTS
NORTH AMERICA			
East–Central California and Northwestern Nevada	+24 to +29	+2 to +3	WARM – 2 to 5 weeks
Northern Mexico	Around +26	Around –2	COOL – 4 to 5 weeks
Eastern United States	+23 to +29	Around +2	WARM – 2 to 4 weeks
Eastern Maritime Provinces of Canada	+9 to +14	–2 to –4	Very cool first half of July
East–Central Canada	+6 to +15	+2 to +3	Very warm early and late in July
SOUTH AMERICA AND EASTERN PACIFIC			
No Significant Temperature Anomalies			
EUROPE AND THE MIDDLE EAST			
Iceland	+12 to +13	Around +2	Very warm first half of July
Europe	+4 to +25	+2 to +3	Very warm first half of July
Ukrainian S.S.R.	+24 to +26	Around +2	WARM – 2 to 4 weeks
AFRICA			
No Significant Temperature Anomalies			
ASIA			
India and Pakistan	+32 to +36	Around +2	Very warm first half of July
Siberia	+14 to +21	+2 to +7	WARM – 4 to 10 weeks
Southern Japan	+27 to +30	Around +2	Very warm first half of July
Peninsular Malaysia	Around +28	Around +2	Very warm second half of July
AUSTRALIA AND WESTERN PACIFIC			
No Significant Temperature Anomalies			



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the one month period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total one month precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of one month precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

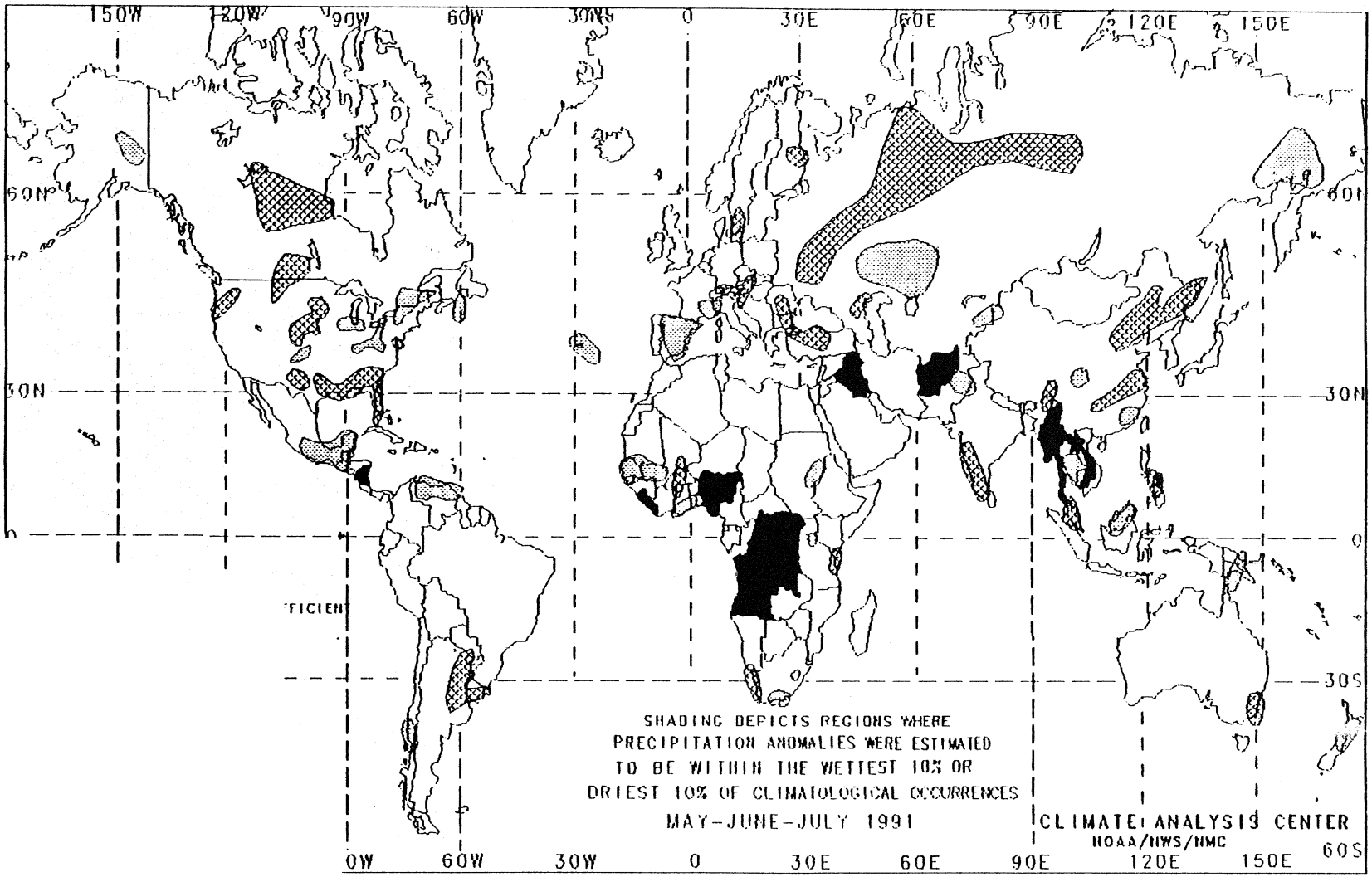
PRINCIPAL PRECIPITATION ANOMALIES

JULY 1991

REGIONS AFFECTED	PRECIPITATION TOTAL (MM)	PERCENT OF NORMAL	COMMENTS
NORTH AMERICA			
East–Central Alaska	Around ZERO	Around ZERO	DRY – 8 to 14 weeks
Southern Alberta	15 to 29	17 to 44	DRY – 4 to 7 weeks
Southern Manitoba	109 to 175	193 to 275	Heavy precipitation first half of July
Southeastern Canada	24 to 55	24 to 48	DRY – 7 to 9 weeks
Northern Great Lakes	137 to 195	168 to 213	WET – 2 to 4 weeks
Midwestern United States	9 to 43	9 to 50	DRY – 7 to 15 weeks
Colorado and Wyoming	86 to 104	182 to 216	WET – 5 weeks
Southern High Plains	2 to 6	3 to 8	DRY – 9 to 10 weeks
Texas, New Mexico, and Adjacent Mexico	67 to 281	206 to 499	WET – 2 to 10 weeks
Louisiana	Around 334	Around 190	WET – 22 weeks
Southeastern United States	183 to 444	209 to 326	WET – 5 to 6 weeks
West–Central Mexico	352 to 561	218 to 910	WET – 5 weeks
SOUTH AMERICA AND EASTERN PACIFIC			
Northern Venezuela	9 to 74	19 to 46	DRY – 5 to 18 weeks
Northern Brazil	179 to 483	202 to 268	WET – 5 weeks
Peru	10 to 27	9 to 17	DRY – 4 to 6 weeks
Eastern Brazil	3 to 87	3 to 48	DRY – 4 to 6 weeks
Uruguay	123 to 241	209 to 245	WET – 5 weeks
East–Central Argentina	2 to 8	6 to 15	DRY – 6 weeks
EUROPE AND THE MIDDLE EAST			
Southwestern Greenland	4 to 26	13 to 34	DRY – 4 weeks
Northern Finland	14 to 27	20 to 36	DRY – 7 weeks
Baltic States	6 to 41	12 to 44	DRY – 5 to 8 weeks
Netherlands	16 to 37	16 to 40	DRY – 5 weeks
West Coast of Europe	61 to 153	162 to 298	WET – 4 weeks
Northeastern Spain and Southwestern France	2 to 12	9 to 38	DRY – 10 weeks
Central Europe	23 to 49	27 to 44	DRY – 5 to 6 weeks
Southeastern Europe	53 to 226	153 to 663	WET – 5 to 6 weeks
Eastern European Soviet Union	2 to 16	4 to 24	DRY – 5 weeks
AFRICA			
Senegal and Mauritania	0 to 29	0 to 26	DRY – 14 weeks
Eastern Mali	65 to 215	184 to 394	WET – 4 weeks
Burkina Faso and Western Niger	41 to 106	24 to 53	DRY – 4 to 9 weeks
East–Central Sudan	2 to 40	2 to 30	DRY – 4 to 10 weeks
Kenya	50 to 62	299 to 522	WET – 4 to 9 weeks
Western South Africa	47 to 167	206 to 307	WET – 10 weeks
ASIA			
Northwestern Siberia	115 to 160	241 to 315	WET – 5 weeks
Kazakh S.S.R.	0 to 16	0 to 34	DRY – 10 weeks
Eastern Siberia	5 to 12	11 to 23	DRY – 5 to 7 weeks
Central Japan	288 to 374	179 to 199	WET – 2 to 4 weeks
Korea and Northeastern China	186 to 419	152 to 310	WET – 2 to 5 weeks
Central China	21 to 59	20 to 36	DRY – 5 to 10 weeks
South–Central and East–Central China	327 to 688	140 to 441	Heavy precipitation first half of July
Taiwan and Southeastern China	11 to 134	10 to 38	DRY – 5 weeks
Pakistan	0 to 31	0 to 18	DRY – 9 to 10 weeks
Peninsular Malaysia	34 to 58	19 to 38	DRY – 6 weeks
AUSTRALIA AND WESTERN PACIFIC			
Southeastern Australia	108 to 289	181 to 351	Heavy precipitation first half of July

3-MONTH GLOBAL PRECIPITATION ANOMALIES

MAY – JULY 1991



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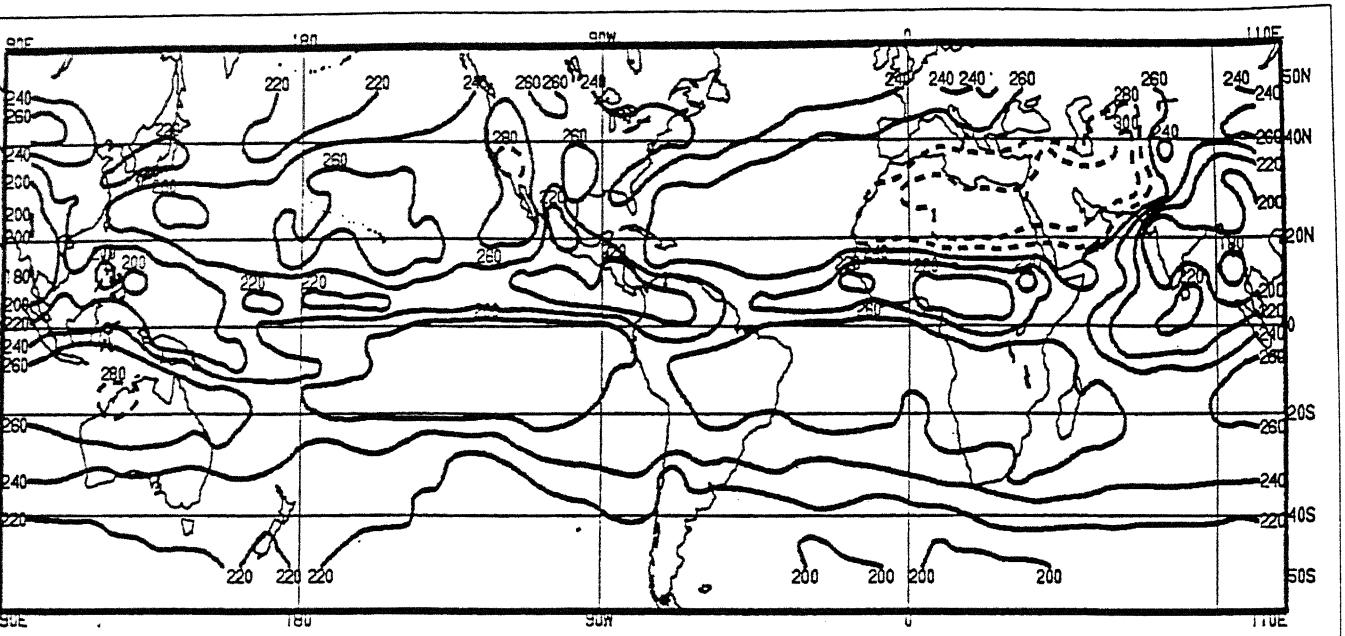
The chart shows general areas of three month precipitation anomalies. Caution must b used in relating it to local conditions, especially in mountainous regions.

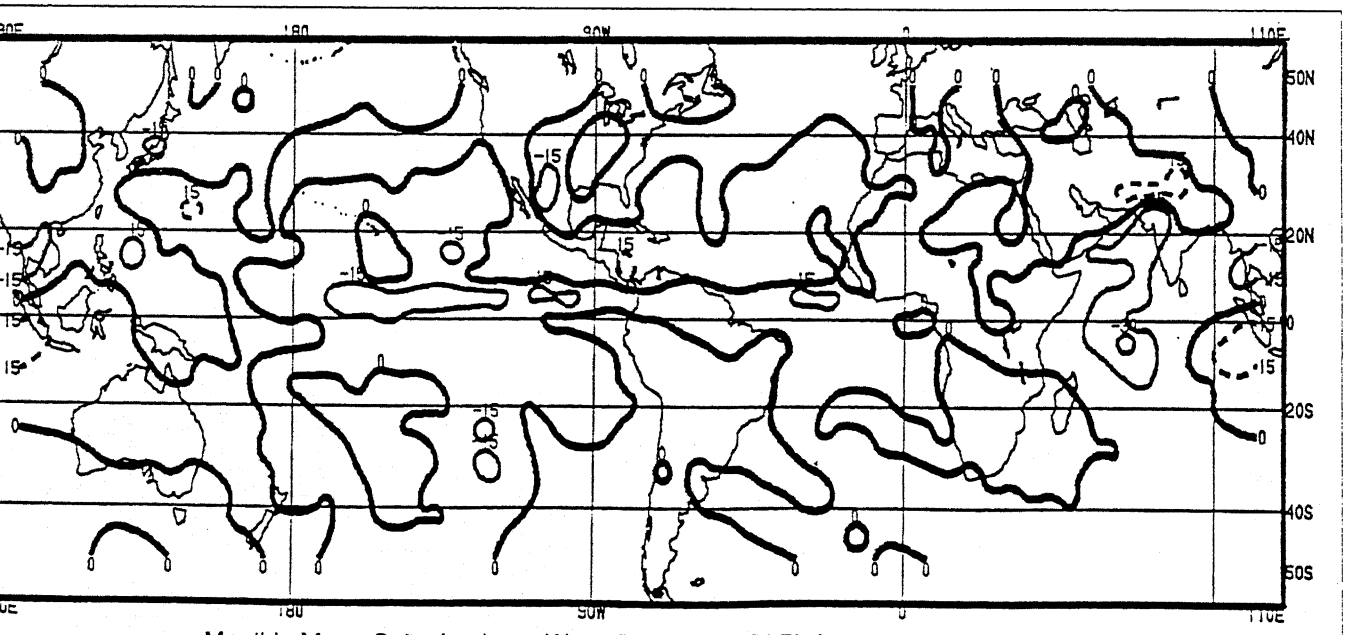


Monthly Mean Outgoing Long Wave Radiation (OLR) for July, 1991

EXPLANATION

The mean monthly outgoing long wave radiation (OLR) as measured by the NOAA-9 AVHRR IR window channel by NESDIS/SRL pp). Data are accumulated and averaged over 2.5° areas to a 5° Mercator grid for display. Contour intervals are 20 Wm^{-2}, and contours 280 Wm^{-2} and above are dashed. In tropical areas (for our purposes 20°N - 20°S) that receive primarily convective rainfall, a mean OLR lue of less than 200 Wm^{-2} is associated with significant monthly precipitation, whereas a value greater than 260 Wm^{-2} normally indicates tle or no precipitation. Care must be used in interpreting this chart at higher latitudes, where much of the precipitation is non-convective. in some tropical coastal or island locations, where precipitation is primarily orographically induced. The approximate relationship tween mean OLR and precipitation amount does not necessarily hold in such locations.

The mean monthly outgoing long wave radiation anomalies (bottom) are computed as departures from the 1979 - 1988 base period ean. Contour intervals are 15 Wm^{-2}, while positive anomalies (greater than normal OLR, suggesting less than normal cloud cover and/or ecipitation) are dashed and negative anomalies (less than normal OLR, suggesting greater than normal cloud cover and/or precipitation) e solid.



Monthly Mean Outgoing Long Wave Radiation (OLR) Anomaly for July, 1991